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Recommended Diagnostic Testing and Treating of Pertussis
Wisconsin Division of Public Health

Diagnostic Tests

PCR: Polymerase Chain Reaction (PCR) is supplanting culture as the test of choice for diagnosis of pertussis for the following reasons:

- Culture requires special media and incubation of up to 7 days
- Culture sensitivity decreases in older or previously immunized patients
- Culture sensitivity decreases in patients treated with antibiotics
- PCR can detect the presence of *B. pertussis* in a processed specimen in less than one hour

Culture: CDC and the Wisconsin State Laboratory of Hygiene (WSLH) also recommend culture whenever PCR is performed, as the culture is important to isolate the organism for antimicrobial resistance monitoring and for epidemiologic purposes. However, when culture cannot be performed at the same time it is advised to have the PCR performed without culture (rather than not testing the patient).

To ensure that cases of pertussis are investigated in a timely manner it is important that specimens be submitted to the testing laboratory immediately. Please do not hold specimens for group submission.

Specimen Collection

The WSLH offers both PCR and Culture testing. Request kit #30 and the accompanying date form "CDD Requisition Form (A)" from the WSLH by calling (800) 862-1088 or (608) 265-2966. If you have questions, please contract the WSLH Customer Service at (800) 862-1013.
Tests offered include:

- Bordetella pertussis PCR Test code 623PCR
- Bordetella Culture Test code 623C

Kit # 30 kits contains among, other things, one sterile calcium alginate tipped swab (for culture) and one Dacron® polyester tipped swab (for PCR) along with corresponding sterile screw-capped tubes and transport medium. The swab applicators use a flexible wire, which is the only device that should be used to insert in the nasopharynx for the collection of the specimen. When collecting the specimen, gently insert the swabs into separate nares and proceed gently to the posterior wall of the pharynx (see diagram).

Do not direct the swabs upward, let them creep along the floor of the nasal cavity. Do not force the swab past obstruction. Hold the swabs in place for up to 10 seconds or until a paroxysmal cough is elicited (or ask the patient to cough). This should ensure an adequate specimen and reduce the possibility of false negative results. Some practitioners have found it easier to insert both swabs into the same nares, which is acceptable. Also, slightly bending the wire swab into an arc shape may allow for easier insertion into the pharynx.

Both the calcium alginate and Dacron® polyester tipped swabs, which look identical, work best if they are placed in the appropriate transport medium. However, if they are inadvertently put in the wrong medium, the PCR and culture can still be successfully tested per the WSLH.

Treatment and Chemoprophylaxis

Antimicrobial agents given during the catarrhal stage may ameliorate the disease. After the cough is established, antimicrobial agents may have no discernible effect on the course of illness but are recommended to limit the spread of organisms to 5 days in contrast to approximately 3 weeks in untreated persons. The preferred antimicrobial agents for treatment and prophylaxis of pertussis for persons 6 months of age and older are the macrolides: azithromycin, clarithromycin, or erythromycin. Trimethoprim-sulfamethoxazole can be used as an alternate antimicrobial agent. Providers should consider safety, evaluation of concurrent medications for potential interactions, adherence to the prescribed regimen, and cost when choosing a macrolide or alternative agent for any patient. The complete recommendations are available from the CDC in the Morbidity and Mortality Weekly Report (MMWR) found at www.cdc.gov/mmwr/preview/mmwrhtml/rr5414a1.htm. The dosage, frequency, and duration of these drugs when used for prophylaxis are the same as for treatment. When considering treatment: treatment of infants <1 year should be within 6 weeks of cough onset. Table 1 (attached) summarizes the treatment and postexposure recommendations.

1. Azithromycin

Recommended regimen:

- Infants aged <6 months: 10 mg/kg per day for 5 days.
- Infants and children aged ≥6 months: 10 mg/kg (maximum: 500mg) on day 1, followed by 5 mg/kg per day (maximum: 250 mg) on days 2-5.
- Adults: 500 mg on day 1, followed by 250 mg per day on days 2-5.

2. Erythromycin

Recommended regimen:

- Infants aged <1 month: not preferred because of risk for infantile hypertrophic pyloric stenosis (IHPS). Azithromycin is the recommended antimicrobial agent. If azithromycin is not available and erythromycin is used, the dose is 40-50 mg/kg per day in 4 divided doses for 14 days.
- Infants ≥1 month and older children: 40-50 mg/kg (maximum: 2 g per day) in 4 divided doses for 14 days.
- Adults: 2 g per day in 4 divided doses for 14 days.

Because relapses have been reported after completion of 7-10 days of treatment with erythromycin, a 14-day course of erythromycin is recommended for treatment or for postexposure prophylaxis of close contacts of pertussis patients.

3. Clarithomycin

Recommended regimen:

- Infants aged <1 month: not recommended.
- Infants and children aged ≥1 month: 15 mg/kg (maximum: 1 g per day) in 2 divided doses each day for 7 days.
- Adults: 1 g per day in 2 divided doses for 7 days.

4. Trimethoprim-Sulfamethoxazole (TMP-SMZ) Alternative treatment for patients who cannot tolerate macrolides.

TMP-SMZ (or co-trimoxazole) may be used as an alternative agent in patients who are allergic to macrolides, who cannot tolerate macrolides, or who are infected, rarely, with a macrolide-resistant strain of Bordetella pertussis. TMP-SMZ should not be administered to pregnant women, nursing mothers or infants aged <2 months.

Recommended regimen:

- Infants aged <2 months: contraindicated.
- Infants and children aged ≥2 months: trimethoprim 8 mg/kg per day, sulfamethoxazole 40 mg/kg per day in 2 divided doses for 14 days.
- Adults: trimethoprim 320 mg/kg per day, sulfamethoxazole 1600 mg/kg per day in 2 divided doses for 14 days.

5. Other antimicrobial agents

Although in vitro activity against *B. pertussis* has been demonstrated for other macrolides no published data exist on the clinical effectiveness of these agents. Other antimicrobial agents due to inhibitory concentrations of potentially harmful side effects in children are recommended for treatment or postexposure prophylaxis of pertussis.

Chemoprophylaxis

For chemoprophylaxis, the benefits of administering a macrolide should be weighed according to the risk of disease and complications versus the potential adverse effects of the drug. Because of severe and sometimes fatal pertussis-related complications in infants under 6 months of age, postexposure chemoprophylaxis should be given.

For infants <6 months of age, the recommended antibiotics for chemoprophylaxis are the same as those for treatment of pertussis. Infants <1 month of age who receive any macrolide should be monitored for the development of IHPS, and, as with other antibiotics with limited experience, for other serious adverse events.

If you have any question contact the Immunization Program at 608-266-3031 or 608-266-1339

A sterile swab is passed gently through
the nostril and into the nasopharynx